

REMARKS

An excess claim fee payment letter is submitted herewith for six (6) additional excess total claims.

Claims 1-26 are all the claims presently pending in the application. Claims 1, 5-6, 9, and 18 are amended to more clearly define the invention and claims 20-26 are added. Claims 1, 9, and 18 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicants also note that, notwithstanding any claim amendments herein or later during prosecution, Applicants' intent is to encompass equivalents of all claim elements.

Claims 1, 3, 5, 7, 9-12, and 15-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kamiyama, et al. reference in view of the Hansen, et al. reference. Claims 2, 4, 8, and 13-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kamiyama, et al. reference in view of the Hansen, et al. reference and further in view of the Nakaura reference. Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the Kamiyama, et al. reference in view of the Hansen, et al. reference and in further view of the Yamada, et al. reference.

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention is directed to a magnetic bearing controller including a processor that controls a magnetic bearing using a magnetic bearing control signal and a counter that accumulates and counts an actual work time of a managed component based upon the magnetic bearing control signal. The processor also compares the accumulated actual work time with a preset maintenance time.

Conventional magnetic bearing control devices include a digital signal processor (DSP) that controls the magnetic bearing and also determines when the bearing has malfunctioned (page 1, line 22 - page 2, line 11). However, the magnetic bearings include components with a relatively short service life and, since there is no accumulation of operation time, maintenance times cannot be anticipated prior to a malfunction of these components.

By contrast, the present invention provides a magnetic bearing controller with a processor that not only controls the magnetic bearing but also compares the accumulated actual work time with a preset maintenance time. In this manner, the present invention enables maintenance procedures to be more accurately anticipated which in turn can reduce down-time and costs associated with that down-time.

Additionally, since the processor performs both the functions of controlling the bearing and performing the comparison, additional components are not required merely for the purpose of performing a comparison.

In this manner, the actual work time is based upon the time of operation of the magnetic bearing which is much more closely related to the actual time of operation, rather than upon the

time when the controller receives power which might include time in which the magnetic bearing is not receiving a magnetic bearing control signal and, therefore, the magnetic bearing is not operating.

II. THE 35 U.S.C. § 112, SECOND PARAGRAPH REJECTION

The Examiner alleges that claims 1-19 are indefinite. In particular, the Examiner alleges that claims 1-19 are vague and indefinite because “it is unclear what constitutes ‘based on.’” The Examiner alleges that the specification does not disclose what constitutes “based on” and the Examiner then attempts to equate “based on” with “operating time.”

Applicants respectfully traverse this rejection.

Applicants respectfully submit that “the scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art” (M.P.E.P. 2171) in satisfaction of the requirements of 35 U.S.C. § 112, second paragraph.

As clearly described by the specification, the present invention includes a counter that counts an actual work time of a managed component based upon a magnetic bearing control signal. The counting being based upon the control signal is clearly described in the specification at, for example, page 17, line 22 - page 19, line 9.

In particular, the specification clearly explains that the digital signal processor 15 outputs a control signal (e.g., control current signal) to the magnetic bearing 23 through the D/A converter 13 and the magnetic bearing drive circuit 5 (page 17, line 24 - page 18, line 1). Thus, the digital signal processor outputs a magnetic bearing control signal.

The specification also explains, using an example of control of the cooling fan 26, that the digital signal processor instructs the counter to count the energization time (e.g., actual work time) of the cooling fan after outputting a fan drive signal to the cooling fan drive circuit 7 to drive the cooling fan 26 (page 19, lines 1 - 9). Thus, since the instruction from the DSP 15 to the counter 14 to start counting is in response to outputting the fan drive signal, the counting of the actual work time by the counter is based on the fan drive signal.

While the description at page 19, lines 1- 9 describes basing the counting of the actual work time of the fan on the fan drive signal, this description is merely an example and operation with respect to other components (e.g., the magnetic bearing) is the same.

Applicants respectfully submit that “the scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art” (M.P.E.P. § 2171) with respect to the counting of the actual work time being based on the magnetic bearing control signal.

Further, the Examiner attempts to equate “based on” with “operating time.” However, the Examiner exhibits a clear misunderstanding of the present invention and a lack of review of the present specification by making such an allegation.

Indeed, the Examiner’s attempt to substitute “operating time” for “based upon” provides a non-sensical result. The present invention includes a counter that counts an actual work time of a managed component based upon a magnetic bearing control signal. To substitute “operating time” in lieu of “based upon” as alleged by the Examiner in the above sentence results in the following non-sensical phrase: “a counter that counts an actual work time of a managed component operating time a magnetic bearing control signal.” Clearly, the Examiner’s attempt to equate and/or substitute “operating time” with “based upon” provides

a non-sensical interpretation.

The Examiner clearly ignores the plain meaning of “based on” when equating that language with “operating time.”

“THE WORDS OF A CLAIM MUST BE GIVEN THEIR ‘PLAIN MEANING’ UNLESS THEY ARE DEFINED IN THE SPECIFICATION”

“Ordinary, simple English words whose meaning is clear and unquestionable, absent any indication that their use in a particular context changes their meaning, are construed to mean exactly what they say. ”

(M.P.E.P. § 2111.01).

The plain meaning of “based on” is defined, for example, as “to have a basis; be based (usually fol. by *on* or *upon*): *Fluctuating prices usually base on a fickle public’s demand. . .*

Basis more often refers to a figurative support: *the basis of a report.*” (see attached Webster’s Encyclopedic Unabridged Dictionary of the English Language, 1989, page 123).

Therefore, the plain meaning of the language of the claims makes it clear that, in accordance with the very clear description of exemplary embodiments that are provided by the specification, that the counter counts the actual work time based upon the magnetic bearing control signal.

Lastly, this Amendment adds new claims 20-26 which each recite features that are directed to how exemplary embodiments base the actual work time upon a control signal. For example, new claim 20 explains that the digital processor outputs an instruction to the counter to count the actual work time in response to outputting the magnetic bearing control signal to the magnetic bearing. In this manner, the actual work time is based upon the control signal.

In view of the foregoing, the Examiner is respectfully requested to withdraw this rejection.

III. THE PRIOR ART REJECTIONS

A. The Kamiyama et al. reference in view of the Hansen et al. reference

Regarding the rejection of claims 1, 3, 5, 7, 9-12, and 15-19, the Examiner alleges that the Hansen et al. reference would have been combined with the Kamiyama et al. reference to form the claimed invention. Applicants submit, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

That is, Applicants submit that one of ordinary skill in the art would readily recognize that the remote control system that is disclosed by the Kamiyama et al. reference is completely different from the maintenance system that is disclosed by the Hansen et al. reference.

As M.P.E.P. § 2143.01 states:

“If the proposed modification or combination of the prior art would change the principal of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious.”

Applicants also submit that these references would not have been combined as alleged by the Examiner. Indeed, the references are directed to completely different matters and problems.

The Kamiyama et al. reference is directed to the problem of “grasping the

operating state of a machine main body by using an information processing means installed in a remote place, and to enable adjustment of a control means.” (PROBLEM TO BE SOLVED).

In stark contrast, the Hansen et al. reference is directed to providing “a programmable maintenance timer system which could notify service personnel when servicing is required for each specific installation.” (Col. 1, lines 32-35).

One of ordinary skill in the art who was concerned with receiving operating information and controlling a machine remotely as the Kamiyama et al. reference is concerned with addressing would not have referred to the Hansen et al. reference to solve this problem (and vice-versa) because the Hansen et al. reference is directed to the completely different problem of providing a programmable maintenance timer system.

The Examiner alleges that the Kamiyama et al. reference “teaches that magnetic bearings (including DSP and drive signal) requires need (sic) periodic maintenance.” However, contrary to the Examiner’s allegations, the Kamiyama et al. reference does not mention anything at all about maintenance systems, let alone that any component of a magnetic bearing device requires periodic maintenance.

Rather, the Kamiyama et al. reference is clearly only directed to providing information to a remote location and permitting control from that remote location.

Thus, the references would not have been combined.

Further, Applicants submit that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner.

The Examiner alleges that the Kamiyama et al. reference discloses that

magnetic bearings require periodic maintenance. However, as explained above, the Kamiyama et al. reference clearly does not disclose that magnetic bearings require periodic maintenance.

The Examiner points out that the Kamiyama et al. reference does not teach or suggest a counter and then refers to the Hansen et al. reference for the disclosure of the counter.

The Examiner then alleges that it "would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the magnetic bearings requiring periodic maintenance of Kamiyama (sic) with the timer of Hansen (sic) to accurately provide periodic maintenance to the bearings, as taught by Hansen (sic)."

Since, the Kamiyama et al. reference clearly does not teach or suggest that the magnetic bearings require periodic maintenance one of ordinary skill in the art would not have been motivated to improve the accuracy of a non-existent periodic maintenance system.

Moreover, even assuming arguendo that one of ordinary skill in the art would have been motivated to combine these references, the combination would not teach or suggest each and every element of the claimed invention.

None of the applied references teaches or suggests the features of the claimed invention including: 1) a counter that accumulates and counts an actual work time of a managed component based upon the magnetic bearing control signal (claims 1 and 9); and 2) a method that counts an actual work time of the magnetic bearing using a counter that accumulates and counts the actual work time based upon the magnetic bearing control signal (claim 18).

The Examiner admits that the Kamiyama et al. reference does not teach or suggest a counter.

The Hansen et al. reference does not remedy the deficiencies of the Kamiyama et al. reference.

Indeed, the Hansen et al. reference suffers from the same problems that are solved by the present invention.

As explained above, conventional magnetic bearing control devices did not monitor the actual work time because the counting that was conventionally performed was only based upon when a power source was turned on and not based upon a control signal, let alone when that control signal was sent to the magnetic bearing. Thus, these conventional systems were not able to determine whether the magnetic bearing was actually working. Rather, these conventional system were only able to determine whether power was supplied to the magnetic bearing control device.

Similarly, the Hansen et al. reference discloses a programmable maintenance timer system 10 that receives a “system run” signal from the centrifugal water chilling system 12 via line 14 (col. 3, lines 53 - 58). A computing device 32 counts a pulse signal that is based upon the “system run” signal as received via a divider network 40 and an opto-isolator 42 to determine a total elapsed operating hours. (Col. 3, lines 57 - 67). All subsequent operations and calculations of the periodic maintenance system are based upon this total elapsed operating hours which, in turn, is based upon the “system run” signal from the water chilling system 12.

The Hansen et al. reference explains that the “system run” signal is “an 120 VAC electrical signal on the line 14 having a frequency of 60Hz.” Thus, this “system

run" signal is the same as the commonly available power signal that is used to provide power to the vast majority of electrical devices of a comparable scale to the water chilling system.

Therefore, the "system run" signal is very similar to the "power on" signal that is used by the conventional magnetic bearing systems that are described in the background section of the specification of the present application. In other words, the Hansen et al. reference does not teach or suggest that the "system run" signal is a control signal. Rather, the Hansen et al. reference merely appears to describe a "power on" signal.

As explained above, this is an important distinction. The present invention is capable of determining the actual work time of the magnetic bearing because the counter counts the actual work time based upon a control signal, rather than merely on a power on signal. In this manner, the present invention is able to distinguish between when the magnetic bearing has power being applied and when the magnetic bearing is actually operating because of receiving a control signal.

Indeed, the Hansen et al. reference does not describe a control system that controls the water chilling system. Therefore, the Hansen et al. reference is not capable of determining when components in the chilling system are actually working. Rather, the Hansen et al. reference merely describes the ability to determine when power is applied to the chilling system.

Thus, the Hansen et al. reference suffers from the same problems that are solved by the present invention.

Therefore, the Examiner is respectfully requested to withdraw the rejection of

claims 1, 3, 5, 7, 9-12, and 15-19.

B. The Kamiyama et al. reference in view of the Hansen et al. reference and in further view of the Nakaura reference

Regarding the rejection of claims 2, 4, 8, and 13-14, the Examiner alleges that the Hansen et al. reference would have been combined with the Kamiyama et al. reference and further alleges that the Nakaura reference would have been combined with a combination of the Kamiyama et al. reference and the Hansen et al. reference to form the claimed invention. Applicants submit, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Applicants submit that these references would not have been combined as alleged by the Examiner. Indeed, the references are directed to completely different matters and problems.

As explained above, the Kamiyama et al. reference and the Hansen references are directed to completely different matters and problems and, therefore, one of ordinary skill in the art would not have referred to any one of those references when trying to address the problems that are addressed by the other one of those references.

Further, in stark contrast to the Kamiyama et al. reference and the Hansen reference, the Nakaura reference is directed to matters and problems which are completely different from the matters and problems addressed by the Kamiyama et al. reference and the Hansen reference.

The Nakaura reference is concerned with prohibiting “to drive magnetic

bearings and motors when a battery is in a poor condition" (PURPOSE).

One of ordinary skill in the art who was concerned with receiving operating information and controlling a machine remotely as the Kamiyama et al. reference is concerned with addressing or who was concerned with the problem of providing a programmable maintenance timer system as the Hansen et al. reference is concerned with solving would not have referred to the Nakaura reference because the Nakaura reference is directed to the completely different problem of prohibiting driving of magnetic bearings and motors when a battery is in a poor condition. Thus, these references would not have been combined.

Further, Applicants submit that the Examiner can point to no motivation or suggestion in the references to urge the combination as alleged by the Examiner.

The Examiner alleges that the "Namakura (sic) teaches that the bearing control circuit include (sic) a signal that prevents activation of the bearings in a poor condition."

However, the Examiner conveniently overlooks (or ignores) that the Nakaura reference does not teach or suggest "bearings in a poor condition." (Emphasis added). Rather, the Nakaura reference discloses when "a battery is in a poor condition" (emphasis added, PURPOSE).

Indeed, the Nakaura reference explains that it determines whether a battery is in a poor condition "by measuring battery voltage after the battery has been discharged for a specified time when a power supply for a drive device is turned on, and thereby detecting that the battery is in a poor condition." (Id.).

Therefore, the Examiner's allegation that the Nakaura reference discloses

preventing activation when the bearings are in a poor condition is false and, therefore, clearly does not provide any basis for a *prima facie* of obviousness (see citation to Webster's Dictionary above regarding the definition of "basis" or "based on").

Moreover, even assuming arguendo that one of ordinary skill in the art would have been motivated to combine these references, the combination would not teach or suggest each and every element of the claimed invention.

As explained above, neither the Kamiyama et al. reference nor the Hansen et al. reference teaches or suggests the features of the claimed invention including: 1) a counter that accumulates and counts an actual work time of a managed component based upon the magnetic bearing control signal (claims 1 and 9); and 2) a method that counts an actual work time of the magnetic bearing using a counter that accumulates and counts the actual work time based upon the magnetic bearing control signal (claim 18).

The Nakaura reference does not remedy these deficiencies.

Indeed, the Examiner does not allege that the Nakaura reference remedies these deficiencies.

Rather, the Nakaura reference is only concerned with prohibiting driving of magnetic bearings and motors when a battery is in a poor condition.

Therefore, the Examiner is respectfully requested to withdraw the rejection of claims 2, 4, 8, and 13-14.

C. The Kamiyama et al. reference in view of the Hansen et al. reference and in further view of the Yamada et al. reference

Regarding the rejection of claim 6, the Examiner alleges that the Hansen et al. reference would have been combined with the Kamiyama et al. reference and further alleges that the Yamada et al. reference would have been combined with a combination of the Kamiyama et al. reference and the Hansen et al. reference to form the claimed invention. Applicants submit, however, that these references would not have been combined and even if combined, the combination would not teach or suggest each and every element of the claimed invention.

Applicants submit that these references would not have been combined as alleged by the Examiner. Indeed, the references are directed to completely different matters and problems.

As explained above, the Kamiyama et al. reference and the Hansen references are directed to completely different matters and problems and, therefore, one of ordinary skill in the art would not have referred to any one of those references when trying to address the problems that are addressed by the other one of those references.

Further, in stark contrast to the Kamiyama et al. reference and the Hansen reference, the Yamada et al. reference is directed to matters and problems which are completely different from the matters and problems addressed by the Kamiyama et al. reference and the Hansen reference.

The Yamada et al. reference is concerned with monitoring operations that are carried out using visual display terminals so that a user can be accurately prompted to rest and avoid physical problems. (Col. 1, line 7 - col. 2, line 23).

One of ordinary skill in the art who was concerned with receiving operating information and controlling a machine remotely as the Kamiyama et al. reference is concerned with addressing or who was concerned with the problem of providing a programmable maintenance timer system as the Hansen et al. reference is concerned with solving would not have referred to the Yamada et al. reference because the Yamada et al. reference is directed to the completely different problem of monitoring operations that are carried out using visual display terminals so that a user can be accurately prompted to rest and avoid physical problems. Thus, these references would not have been combined.

Moreover, even assuming arguendo that one of ordinary skill in the art would have been motivated to combine these references, the combination would not teach or suggest each and every element of the claimed invention.

As explained above, neither the Kamiyama et al. reference nor the Hansen et al. reference teaches or suggests the features of the claimed invention including: 1) a counter that accumulates and counts an actual work time of a managed component based upon the magnetic bearing control signal (claims 1 and 9); and 2) a method that counts an actual work time of the magnetic bearing using a counter that accumulates and counts the actual work time based upon the magnetic bearing control signal (claim 18).

The Yamada et al. reference does not remedy these deficiencies.

Indeed, the Examiner does not allege that the Yamada et al. reference remedies these deficiencies.

Rather, the Yamada et al. reference is only concerned with monitoring

operations that are carried out using visual display terminals so that a user can be accurately prompted to rest and avoid physical problems.

Therefore, the Examiner is respectfully requested to withdraw the rejection of claim 6.

IV. FORMAL MATTERS AND CONCLUSION

The Office Action objects to the specification and requests that the title be amended in accordance with the Examiner's suggestion. However, the title was amended in accordance with the Examiner's suggestion in the Amendment that was filed on February 23, 2004. Therefore, Applicants respectfully request withdrawal of the Examiner's objection.

The Office Action objects to the drawings. In particular, the Examiner alleges that "the counter based upon the drive signal from the DSP" must be shown or the feature canceled from the claims.

However, contrary to the Examiner's allegations, the claims do not recite a "counter based upon the drive signal from the DSP."

Rather, the claims recite "a counter for accumulating and counting an actual work time of a designated managed component based upon said magnetic bearing control signal." That counter is clearly illustrated in Figure 1 with reference numeral 14 and is labeled with the word "COUNTER."

This COUNTER 14, as clearly explained in the specification at, for example, page 19, lines 1 - 9, receives an instruction to start counting from the DSP 15 which provides that instruction to the counter when the DSP outputs a drive signal to the fan.

In other words, the counter starts counting based upon the drive signal. In this manner, the counter 14 accumulates and counts the actual work time based upon the fan drive signal.

The description with respect to the fan is exemplary only and is equally applicable to control of the magnetic bearing using the magnetic bearing control signal. Therefore, the counter 14 accumulates and counts the actual work time based upon the magnetic bearing control signal.

Additionally, as very clearly explained in the specification at, for example, page 21, lines 17-24, the counter may be incorporated into the DSP, and, therefore, the counter 14 may be omitted.

Applicants respectfully request withdrawal of this objection.

The Office Action also objects to claims 1-19 and alleges that the specification does not provide antecedent basis for the drive signal. While Applicants submit that the similarity between a “drive” signal and a “control” signal would be clear to one of ordinary skill in the art taking the present Application as a whole, to speed prosecution claims 1, 9, and 18 have been amended to recite a “control” signal as is clearly supported by the specification at, for example, page 17, line 22 - page 18, line 15.

Applicants respectfully request withdrawal of this objection.

In view of the foregoing amendments and remarks, Applicants respectfully submit that claims 1-26, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest

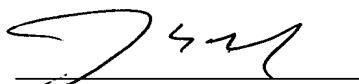
possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 12/14/07

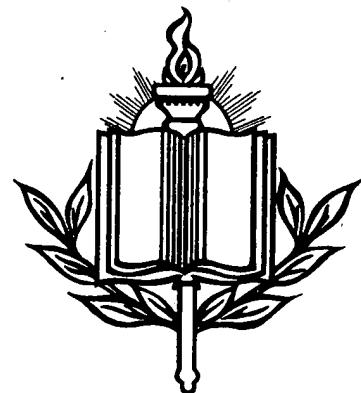


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Attachment
Definition of "based on"

Webster's Encyclopedic Unabridged Dictionary of the English Language



The dictionary entries are based on the First Edition of *The Random House Dictionary of the English Language*

GRAMERCY BOOKS
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Bartlesville

Bar-tles-ville (bär'tlēz vīl), *n.* a city in NE Oklahoma, 27,893 (1960).

Bar-tlett (bär'tlēt), *n.* *Hort.* 1. a large, yellow, juicy variety of pear. 2. the tree bearing this fruit. Also called **Bar-tlett pear**. [so named by Enoch Bartlett of Dorchester, Mass.]

Bar-tlett (bär'tlēt), *n.* 1. **John**, 1820-1905, U.S. publisher and compiler. 2. **Josiah**, 1729-95, U.S. physician and statesman. 3. **Paul Wayland**, 1865-1925, U.S. sculptor. 4. **Robert Abram**, 1875-1946, U.S. arctic explorer, born in Newfoundland. 5. **Vernon**, born 1894, English writer. 6. a boy's given name, form of **Bar-tolomew**.

Bar-tley (bär'tlē), *n.* a boy's given name, form of **Bar-tolomew**.

Bar-tók (bär'tök; Hung. bär'tök), *n.* **Béla** (bä'lā; Hung. bälō), 1881-1945, Hungarian composer.

Bar-to-lom-me-o (bär tol'ō mä'mō; It. bär'tō lōm'mō), *n.* *Fra.* (frā; It. frā), (*Baccio della Porta*), 1475-1517, Italian painter.

Bar-to-loz-zí (bär'tō lōt'sē), *n.* *Fran-cés-co* (frän'chēz kō), 17257-1815, Italian engraver.

Bar-ton (bär'tōn), *n.* 1. **Clara**, 1821-1912, U.S. philanthropist who organized the American Red Cross in 1881. 2. **Sir Edmund**, 1849-1920, Australian jurist and statesman: prime minister 1901-03. 3. a boy's given name.

Bar-ton-ville (bär'tōn vīl), *n.* a town in central Illinois, 7253 (1960).

Bar-tram (bär'trām), *n.* 1. **John**, 1699-1777, U.S. botanist. 2. Also, **Bertram**, a boy's given name.

Bar-tra-mi-an sand/piper (bär trā'mē ēn). See *upland plover*. [named after John Bartram; see -IAN]

Bar-uch (bär'üch *for 1*; bär rōök' *for 2, 3*), *n.* 1. the amanuensis and friend of Jeremiah and nominal author of the book of Baruch in the Apocrypha. Jer. 32:12. 2. **Bernard Man-nes** (man'ēs), 1870-1965, U.S. statesman and financier. 3. a boy's given name.

bar-wise (bär'wīz'), *adj.* *Heraldry*, (of a charge or charges) transversely across an escutcheon, in the manner of a bar. Also, **bar-ways** (bär'wāz'). [BAR¹ + -WISE]

bar-yen-ic coor-dinate system (bär'ēn'itrik). *Math.* a coordinate system for an *n*-dimensional Euclidean space in which each point is represented by *n* constants whose sum is 1 and whose product with a given set of linearly independent points equals the point. [< Gk *bary(s)* heavy + CENTRIC]

bar-ye (bär'ē), *n.* microbar. [< F < Gk *bary* heavy]

bar-ye (bär'ē), *n.* *Antoine Louis* (āñ twān' lōē), 1795-1875, French sculptor and painter.

bar-y-on (bär'ē on'), *n.* *Physics.* a nucleon or a hyperon. [< Gk *bary(s)* heavy + (FERMI)ON]

bar-ya-ta (bär'ē tā), *n.* *Chem.* 1. Also called **calcined baryta**, **barium oxide**, **barium monoxide**, **barium protoxide**, a white or yellowish-white poisonous solid, BaO, highly reactive with water; used chiefly as a dehydrating agent and in the manufacture of glass. 2. Also called **caustic baryta**, **barium hydroxide**, **barium hydrate**, the hydroxide, hydrated form of this compound, Ba(OH)₂·8H₂O, used chiefly in the industrial preparation of beet sugar and for refining animal and vegetable oils. [< NL, equiv. to *bary-* < Gk *bary(s)* heavy] + -ta (< Gk -tēs agent suffix) —**bar-yti-lic** (bär'ētik), *adj.*

bar-y/ta wa/ter, *Chem.* an aqueous solution of barium hydroxide, used chiefly as a reagent.

bar-ye-tes (bär'ē tēz), *n.* *Mineral.* barite.

bar-ye-to-cal-cite (bär'ē tō'kal'sit), *n.* a mineral, double carbonate of calcium and barium, CaCO₃·BaCO₃, usually found in veins of lead minerals. [BARYTE(A) + -O + CALCITE]

bar-y-ton (bär'ē ton'; Fr. bär rōn'), *n., pl.* -**tons** (-tonz'; Fr. -tōn'), an 18th-century stringed instrument with six bowed strings and several additional strings vibrating sympathetically. [see **BARITONE**]

bar-y-tone¹ (bär'ē tōn'), *n., adj.* *Music.* baritone.

bar-y-tone² (bär'ē tōn'), *n.* *Classical Gk. Gram.* —**adj.** 1. having the last syllable unaccented. —**n.** 2. a barytone word. [< Gk *barston*(os), equiv. to *bary(s)* heavy, deep (of sound) + tōnōs TONE]

B.A.S., 1. Bachelor of Agricultural Science. 2. Bachelor of Applied Science.

ba-sad (bā'sad), *adv.* toward the base. [BASE¹ + -ad < L *ad* to, toward]

ba-sal (bā'sal), *adj.* 1. of, at, or forming the base. 2. forming a basis; fundamental; basic: **basal characteristics**. 3. *Physiol.* a. indicating a standard low level of activity of an organism as present during total rest. b. of an amount required to maintain this level. 4. *Med.* serving to induce a preliminary or light anesthesia prior to total anesthetization. [BASE¹ + -AL'] —**ba-sal-ly**,

ba-sal conglom-erate, a conglomerate deposited on an erosion surface and comprising the bottom layer of a rock series.

ba-sal ganglion, *Anat.* any of four masses of gray matter in each cerebral hemisphere.

ba-sal metabo-lic rate', *Physiol.* the rate of oxygen intake and heat discharge in an organism in a basal state. *Abbr.*: B.M.R.

ba-sal metabo-lism, *Physiol.* the energy turnover of the body at a standard low level of activity.

ba-sal ridge', *Dentistry.* a U-shaped ridge at the base of the posterior surface of the crown of a tooth. Also called **cingulum**.

ba-salt (bā'salt), *n.* the dark, dense igneous rock of a lava flow or minor intrusion, composed essentially of labradorite and pyroxene and often displaying a columnar structure. [< LL *basaltus* (lithos) touchstone, prob. of Afr. orig.] —**ba-sal-tic**, **ba-sal-tine** (bā'sal-tīn, -tin), *adj.*

ba-salt-ware (bā'salt'wār), *n.* unglazed stoneware, usually black with a dull glaze, developed by Josiah Wedgwood. Also called **ba-sal-tes** (bā'sal-tēz). [BASALT + WARE]

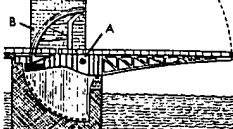
ba-sa-nite (bā'sa nit'), *baz-* (n.), *n.* *Petrog.* a basaltic rock composed chiefly of plagioclase, olivine, and augite. [< L *basanite*(s); see **BASALT**]

bas bleu (bā blū'), *pl.* **bas bleus** (bā blū'). *French.* a bluestocking.

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bas-cin-et (bās' nēt), *n.* —**net**, *n.* *Armor.* basinet.

bas-cule (bās'kyüöl), *n.* *Cin. Eng.* a device operating like a balance or seesaw, esp. an arrangement of a movable bridge (**bas-cule bridge**) by which the rising floor or section is counterbalanced by a weight. [< F *ba(s)cule*, equiv. to *bas* low, **base**² + *cul* rump (see **CULET**) + -e fem. suffix]



Bascule bridge

A. Pivot about which bridge swings in rising; **B.** Toothed quadrant engaging with machinery

base¹ (bās), *n., adj., v., based, bas-ing.* —**n.** 1. the bottom support of anything; that on which a thing stands or rests. 2. a fundamental principle or ground-work; foundation; basis: the **base** of needed reforms.

3. the bottom layer or coating, as of make-up or paint.

4. *Archit.* a. the distinctively treated portion of a column or pier below the shaft or shafts. b. the distinctively treated lowermost portion of any construction, as a monument, exterior wall, etc. 5. *Bot.*, *Zool.*

a. the part of an organ nearest its point of attachment. b. the point of attachment. 6. the principal element or ingredient of anything, considered as its fundamental part: *face cream with a lard base; paint with a lead base*.

7. that from which a commencement, as of action or reckoning, is made; a starting point or point of departure. 8. *Baseball*, a. any of the four corners of the diamond, esp. first, second, or third base. Cf. *home plate*. b. a square canvas sack containing sawdust or some other light material, for marking first, second, or third base. 9. a starting line or point for runners, racing cars, etc. 10. (in hockey and other games) the goal. 11. *Mil.* a. a fortified or more or less protected area or place from which the operations of an army or an air force proceed. b. a supply installation for a large military force. 12. *Geom.* the line or surface forming that part of a figure which is most nearly horizontal or on which it is supposed to stand. 13. *Math.* a. the number which serves as a starting point for a logarithmic or other numerical system. b. a collection of subsets of a topological space having the property that every open set in the given topology can be written as the union of sets of a point such that every neighborhood of the point contains one from the collection. c. a collection of neighborhoods of a point such that every neighborhood of the point contains one from the collection. d. a collection of sets of a given filter such that every set in the filter is contained in some set in the collection. 14. Also called **base line**. *Survey.* See under *triangulation* (def. 1). 15. *Painting.* a. vehicle (def. 9). b. Also called **carrier**, inert matter, used in the preparation of lakes, onto which a coloring compound is precipitated. 16. *Chem.* a. a compound which reacts with an acid to form a salt, as ammonia, calcium hydroxide, certain nitrogen-containing organic compounds, as the amines and alkaloids, etc. b. the hydroxide of a metal or of an electropositive element or group. c. a group or molecule which takes up or accepts protons. d. a molecule or ion containing an atom with a free pair of electrons that can be donated to an acid; an electron-pair donor. 17. *Gram.* the part of a complex word, consisting of one or more morphemes, to which derivational or inflectional affixes may be added, as *want* in *unwanted*, *biolog*- in *biological*, etc. Cf. *root* (def. 11), *stem* (def. 14). 18. an electrode or terminal on a transistor other than the emitter or collector electrodes or terminals. 19. *Elect.*, *Electronics.* the part of an incandescent lamp or electron tube that includes the terminals for making electrical connection to a circuit or power supply. 20. *Heraldry.* the lower part of an escutcheon. 21. **bases**, *Armor.* a tonlet formed of two shaped steel plates assembled side by side. 22. *get to first base*. See *first base* (def. 2). 23. *in base*, *Heraldry.* in the lower part of an escutcheon. 24. *off base*, *a.* *Baseball.* not touching a base: *The pitcher caught him off base and, after a quick throw, he was put out by the second baseman.* b. *Informal.* badly mistaken: *The police were way off base when they tried to accuse her of the theft.* 25. *on base*, *Baseball.* having reached a base or bases: *Two men are on base. Also, on.* 26. *serving as or forming a base*: *The walls will need a base coat and two finishing coats.* 27. *to make or form a base or foundation for*. 28. *to establish, as a fact or conclusion (usually fol. by on or upon): He based his assumption of her guilt on the fact that she had no alibi.* 29. *to place or establish on a base or basis; ground; found; establish*: *Our plan is based on a rising economy.* 30. *to station, place, or establish (usually fol. by at or on): He is based at Fort Benning. The squadron is based on a carrier.* 31. *to have a basis; be based (usually fol. by on or upon): Fluctuating prices usually base on a fickle public's demand.* 32. *to have or maintain a base (usually fol. by on or upon): I believe they had based on Greenland at one time. [ME < MF < L *basis* BASIS]*

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base¹⁰ (bās), *n.* 1. *Music.* Obs. deep or grave in sound; bass: *the base tones of a piano.* —**n.** 10. *Music.* Obs. bass (defs. 3, 4). [late ME *ME bass*, *bace* < MF *bas* (masc.), *base* (fem.) < LL *bassus*, -a, -um low, short, perh. < Gk *bassos* deeper]

base¹¹ (bās), *adv.* —**base'ness**, *n.*

Syn. 1. despicable, contemptible. See **mean²**. 2. servile, ignoble, abject, slavish, menial. 3. poor, inferior, cheap, tawdry. 4. fake, spurious.

baseplate

servitude. 9. Obs. deep or grave in sound; bass: *the base tones of a piano.* —**n.** 10. *Music.* Obs. bass (defs. 3, 4). [late ME *ME bass*, *bace* < MF *bas* (masc.), *base* (fem.) < LL *bassus*, -a, -um low, short, perh. < Gk *bassos* deeper]

base¹² (bās'bōl'), *n.* 1. a game of ball played by two nine-man teams on a square formed by lines connecting four bases, all of which must be touched by a base runner in order to score a run. 2. the ball used in this game, being a sphere approximately three inches in diameter with a twine-covered center of cork covered by stitched horsehide. 3. *Cards.* a variety of five-card or seven-card stud poker in which nines and threes are wild and in which threes and fours dealt face up gain the player either penalties or privileges. [BASE¹ + BALL¹]

base¹³ (bās'bōl'), *n.* a padded, leather covering for the hand, having a pocket in the area over the palm, webbing between the sections for the thumb and forefinger, and either separate sections for each finger or sections for more than one finger: used by baseball players in the field for catching batted or thrown balls. Cf. mitt (def. 2).

base¹⁴ (bās'bōl'), *n.* 1. Also called **moboard**, **skirt**, a board forming the foot of an interior wall. 2. a board forming the base of anything. [BASE¹ + BOARD]

base¹⁵ (bās'bōl'), *adj.* 1. of humble birth. 2. born out of wedlock; illegitimate. 3. having a base nature; mean. [BASE¹ + BORN]

base¹⁶ (bās'bōl'), *n.* a unit used in the sale of tin plate, equal to the total area of 112 sheets each measuring 14 inches by 20 inches, or 31,360 square inches.

base¹⁷ (bās'bōl'), *n.* Metal, smelted lead containing impurities, as gold, silver, zinc, etc., which are later removed.

base¹⁸ (bās'bōl'), *n.* U.S. a stove or furnace with a twine-covered center of cork covered by stitched horsehide. Also, **base' burn'er**, **base'burn'er**. [BASE¹ + BURNER]

base¹⁹ (bās'bōl'), *n.* 1. a first coat of a surfacing material, as paint. 2. any coat of plastering beneath the finish coat. [BASE¹ + COAT]

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